Intrinsically Safe WindObserver Anemometer

User Manual

Doc No. 1360-PS-0001
Issue 03

Gill Instruments Ltd recognise all trademarks

Gill Instruments Limited
Saltmarsh Park,
67 Gosport Street,
Lymington,
Hampshire.
SO41 9EG
UK

Tel: +44 (0) 1590 613500
Fax: +44 (0) 1590 613501
E-mail: anem@gill.co.uk
Website: www.gill.co.uk

GILL
Intrinsically Safe
WindObserver
Gill Instruments Ltd. Lymington, Hampshire, England. SO41 9EG
Tel: +44 1590 613500, Fax: +44 1590 613501, Email: gill@gill.co.uk

WARNING:

ENSURE CORRECT SUPPLY VOLTAGE IS SELECTED ON POWER SUPPLY BEFORE INSTALLATION

1. FOREWORD....5
2. PACKING LIST....5
3. INSTALLATION....6
3.1 Mounting....6
3.2 Alignment....6
3.3 Sealing....6
3.4 Corrosion....6
3.5 Earthing....6
3.6 Cabling....6
3.7 General....6
4. SYSTEM OPERATION....7
4.1 Wind Measurement....7
4.1.1 Measurement Sampling Rates and Averages....7
4.2 System Configuration....7
4.3 Default System Configuration....7
5. CONNECTION TO A PC OR OTHER DEVICE....8
6. USING THE ANEMOMETER WITH A COMPUTER AND YOUR SOFTWARE....9
6.1 Digital Serial Output Formats....9
6.2 Digital Format Notes....12
6.3 Status Code....12
7. ANEMOMETER SOFTWARE COMMANDS....14
7.1 Configuration Mode....14
7.2 Polled Operation....14
7.3 Output Mode....14
7.4 Output Units....14
7.5 Measurement Average....14
7.6 Output String Padding....14
7.7 Baud Rate....15
7.8 Sample Period....15
7.9 Parity....15
7.10 Vertical Padding....15
7.11 Unit Identification....15
7.12 Diagnostics....15
8. DRAWINGS....16
1086-G-045 Anemometer Installation Details....17
1360-G-026 Type IIc I.S. Anemometer Dimensions....18
1360-G-028 I.S. WindObserver II System Diagram Sheet 1 of 2....19
1360-G-028 I.S. WindObserver II System Diagram Sheet 2 of 2....20
1360-M-039 I.S.Terminal Arrangement....21
1360-G-043 I.S. PCI Unit....22
9.1 Specification....23
10. POWER AND COMMUNICATIONS INTERFACE....25
10.1 PCI....25
10.1.1 External Connections....25
10.1.2 Electrical Power Requirements....25
10.1.3 Internal Supply....25
10.1.4 External Supply....25
10.1.5 RS422 Interface....25
10.1.6 Cable Requirements....25
10.1.7 Environmental....26
10.1.8 Material....26
10.1.9 EMC....26
APPENDIX 1....27
SUMMARY OF ABBREVIATIONS USED IN THIS MANUAL....27
OPTIONAL EXTRAS....29

APPENDIX 2.....30
PRODUCT APPROVALS.....30
SIRA CERTIFICATION.....30

1. FOREWORD

This manual refers to the Gill Instruments Ltd Intrinsically Safe WindObserver ultrasonic anemometer. It is an extremely sophisticated instrument and to achieve optimum performance we recommend that you read the whole of this manual before proceeding further with use.

The Solent range is in continuous development and so specifications may be subject to change without prior notice.

2. PACKING LIST

- Intrinsically Safe 2 axis anemometer
- Mounting kit
- This manual
- Intrinsically Safe Power & Communications Interface
- Anemometer Connector 20 way
- 3m Anemometer Cable

3. INSTALLATION

3.1 Mounting

The Anemometer should be mounted on a suitable surface as defined in drawing 1086-G-045 shown in Section 8, using the mounting kit supplied and described in the Packing List. **The anemometer does not require any adjustment - do not attempt to dismantle, or warranty and calibration will be void**.

3.2 Alignment

The anemometer should be set to point North, see drawing 1360-G-026 as shown in Section 8, (or to some other known reference direction). This is facilitated by slots in the base for the mounting screws, which allow rotation of the anemometer for fine alignment.

3.3 Sealing

The connector area at the base of the anemometer **should not** be directly exposed to moisture or solvents, as whilst the connectors are sealed when mated, the anemometer is **vented to air at the base** to avoid pressure build up. Therefore **use the gasket** provided in the mounting kit.

3.4 Corrosion

Careful note should be taken of the possibility of galvanic corrosion by incorrect mounting. It is vital that only stainless steel fixings are used and that the instrument is insulated from the mounting surface with the rubber gasket. This will ensure that the anemometer will provide long service under extreme conditions.

3.5 Earthing

The system must be earthed in accordance with local or national regulations. Intrinsically safe operation will be affected if incorrectly earthed.

3.6 Cabling

Ensure that strain relief measures are employed when installing the cables. Do not allow the whole weight of the cable to be applied to the connector.

3.7 General

DO NOT attempt to remove or unscrew any fixing. Any unauthorised adjustment of the unit could affect intrinsic safety and will void the warranty.

The unit must be installed in accordance with the Control Drawing 1360-G-028, Section 8.

4. SYSTEM OPERATION

There are two modes of operation, as follows:

Wind measurement	Normal operating mode
System configuration	Used to reconfigure system. See Section 7.

4.1 Wind Measurement

This is the normal operating mode. Data is output once per second or four times per second.

4.1.1 Measurement Sampling Rates and Averages

There are two sampling rates:

1) One output per second	-	50ms sample rate - block average of 19 measurements / output.
2) Four outputs per second	-	50ms sample rate - block average of 4 measurements / output.

The block averages of 19 and 4 measurements are due to the last sample period being required for measurement scaling and output formatting.

4.2 System Configuration

This mode will allow the user to configure the anemometer via the RS422 interface. It is entered and exited by transmitting control characters to the anemometer, see Section 7. The system will then expect a single character and number sequence which will change mode, wind speed output etc. No security will be included in this mode, but only valid user entries will be accepted. See Section 7 for the full list of commands.

4.3 Default System Configuration

The anemometer is factory configured as follows:

P1:	1 output per second
G1:	Averaging Off
M2:	ASCII Polar Continuous
U1:	m/s
B3:	Baud rate set to 9600
F1:	8 data bits, no parity
NA:	Poll address 'A'
O1:	Comma Separated Variable output
V1:	Vertical Padding Disabled

5. CONNECTION TO A PC OR OTHER DEVICE

Connection to a PC or other device requires the use of:

1) An Intrinsically Safe Power and Communications Interface (PCI) – MUST BE USED UNDER ALL CIRCUMSTANCES.
2) PCI to PC / Other device cable - Digital RS232 9 way “D Type” connector.

The PCI supplies power to the anemometer electronics and provides conversion of the RS422 signal sent by the anemometer to the RS232 signal required by the PC. The PCI requires connection to the mains; for more details refer to Section 10. Computers other than IBM PCs or other compatibles may require a customised cable for connection to the PCI.

The anemometer outputs wind data through a single 20 way circular connector in the base. Details of the pin allocations can be found in Section 9. Data is provided in Digital format.

Baud rate options are:

1) 1200
2) 2400
3) 4800
4) 9600
5) 19200
6) 38400

Three serial data formats are available:

1) 1 start, 8 data, odd parity, 1 stop
2) 1 start, 8 data, even parity, 1 stop
3) 1 start, 8 data, no parity, 1 stop

The selection of different baud rates and data formats require the user to confirm the selection so that the interface between the device and the anemometer cannot be set in a mode that is not valid for both units.

6. USING THE ANEMOMETER WITH A COMPUTER AND YOUR SOFTWARE

The user need not necessarily use a terminal emulator to store and analyse data being sent by the anemometer. This section describes the modes and format of the data output by the anemometer so that you can write your own software.

6.1 Digital Serial Output Formats

There are five wind data modes in ASCII format, one in Binary format and one network identification response available from the serial output of the anemometer as follows:

Mode 1
ASCII, UV, Continuous
<STX><ID>,±UUU.UU,±VVV.VV,U,SS,<ETX>CC<CR><LF>
where:

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
±UUU.UU	-	'U' axis velocity (*1)
±VVV.VV	-	'V' axis velocity (*2)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status data
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

Mode 2
ASCII, Polar, Continuous
<STX><ID>,DDD,MMM.MM,U,SS,<ETX>CC<CR><LF>
where:

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
DDD	-	Direction in degrees
MMM.MM	-	Wind Magnitude (*3)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status data
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

Mode 3
ASCII, UV, Polled
where:
<STX><ID>,±UUU.UU,±VVV.VV,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
±UUU.UU	-	'U' axis velocity (*1)
±VVV.VV	-	'V' axis velocity (*2)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status data
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

Mode 4
ASCII, Polar, Polled
where:
<STX><ID>,DDD,MMM.MM,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
DDD	-	Direction in degrees
MMM.MM	-	Wind Magnitude (*3)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status data
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

(*1) In Feet Per Minute output mode, the string changes to ±UUUU.U

(*2) In Feet Per Minute output mode, the string changes to ±VVVV.V

(*3) In Feet Per Minute output mode, the string changes to MMMM.M

Mode 5
ASCII, UV, Polled, No Tri-State

where:
<STX><ID>,±UUU.UU,±VVV.VV,U,SS,<ETX>CC<CR><LF>

<STX>	-	Start of string character (ASCII value 2)
<ID>	-	Anemometer IDentification (A-Z)
±UUU.UU	-	'U' axis velocity (*1)
±VVV.VV	-	'V' axis velocity (*2)
U	-	Units (M=m/s, N=knots, P=mph, K=kph, F=fpm)
SS	-	Status data
<ETX>	-	End of string character (ASCII value 3)
CC	-	Checksum of all Characters between <STX> and <ETX> (HEX byte)
<CR><LF>	-	Carriage Return and LineFeed

Mode 6
ASCII, NMEA, continuous
where
$IIMWV,$Wc_1$,R,$Wc_2$,Units,Valid,*cc<CR><LF>

'$'	-	Start of string character
'II'	-	Integrated instrument
'MWV'	-	Mean wind direction and velocity
Wc_1	-	Wind component 1
'R'	-	Relative wind measurement
Wc_2	-	Wind component 2
Units	-	Units ident
Valid	-	Valid flag
'*'	-	Checksum delimiter
cc	-	Checksum

Wind Component Fields

Wc_1	Direction in degrees (DDD)
Wc_2	Wind speed (MMM.MM)

Units Field

Value	Units
M	m/s
N	Knots
P	MPH
K	kph
F	FPM

Valid Field

'A'	Valid measurement
'V'	Invalid measurement

Checksum Field

Exclusive OR of all characters between '$' and '*' reported as ASCII hex.

6.2 Digital Format Notes

1) If wind speed is too low to calculate direction (below 0.5m/s) then the direction parameter DDD, in ASCII modes, will remain blank in CSV mode. In fixed field mode, direction freezes at last valid direction.

2) The checksum is the EXCLUSIVE OR of the 8 data bits of each character between and excluding <STX> and <ETX>. The HEX value of the most significant and least significant four bits of the result are converted to 2 ASCII characters for transmission.

3) If the anemometer detects a checksum error in the non-volatile memory, the following ASCII string is output in place of the normal output:
NO CONFIGURATION DATA<CR><LF>.

4) In fixed field mode an error will result in value +99.999 for UV and Magnitude and 999 for direction being reported.

6.3 Status Code

A two character 'Status code' will be transmitted in the serial string. This value will denote the system and measurement status. The codes are:

Code 00 - O.K.

This indicates that the system is operating correctly. The transducers signals are within the required limits and no memory faults have occurred.

Code 01 - Transducer Pair 1 Failed.

This error occurs when there is a blockage in the path of transducer pair one, or when a transducer has failed.

Code 02 - Transducer Pair 2 Failed.

This error occurs when there is a blockage in the path of transducer pair two, or when a transducer has failed.

Code 04 - Transducer Pairs 1 and 2 Failed.
This error occurs when there is a blockage in the path of transducer pairs one and two, or when transducers have failed.

Code 08 - Non-Volatile Memory Checksum Error.
The non-volatile memory (EEPROM) holds the user set up, internal system parameters and calibration data. If the internal checksum programmed in production does not match the one calculated by the system during operation, then this status code will be flagged. An EEPROM error could be caused by a faulty read/write cycle or a complete chip failure.

Code 09 - Volatile Memory Checksum Error.
The volatile memory (SRAM) holds the data, which is used during the vector calibration codes. If the internal checksum programmed in production does not match the one calculated during system operation then this status code is flagged. The unit is operating in uncalibrated mode.

Code 10 - System Gain at Maximum.
This indicates that an ultrasonic signal has been received but the receive gain had to be set to maximum to recover the pulse. This is normally due to partially blocked transducer paths. The wind velocity reported could be in error.

Code 50 - Marginal System Gain Condition.
This indicates that an ultrasonic signal has been received but a high receive gain was required to recover the pulse. This code is asserted during high wind velocities. It may also be caused by partially blocked transducer paths or partially failed transducers (low efficiency). The wind velocity reported will be correct.

Code 51 - Measurement Average Building.
This code is set before the average period selected (3, 5,10 or 15 seconds) has been reached. The reported velocities during this period are only the average calculated for the length of time that the unit has been operational. This code only occurs after a power on or exit from configuration mode.

NOTE Should any of these status codes other than code 00 appear consistently then the unit will need to be returned to the manufacturer for repair.

7. ANEMOMETER SOFTWARE COMMANDS

7.1 Configuration Mode

On, Modes M1, M2	*
On, Modes M3, M4	*x (Where x is polling identifier A-Z)
Off	Q

7.2 Polled Operation

Request Identification	&
Disable Polled Output	!
Enable Polled Output	?
Anemometer Poll	A-Z

The unit will only accept the following commands when in configuration mode:

7.3 Output Mode

ASCII, UV, Continuous	M1
ASCII, Polar, Continuous	M2
ASCII, UV, Polled	M3
ASCII, Polar, Polled	M4
ASCII, UV, Polled, No Tri-State	M5
ASCII, NMEA, Continuous	M6

7.4 Output Units

m/s	U1
Knots	U2
MPH	U3
KPH	U4
FPM	U5

7.5 Measurement Average

Off	G1
3 Second	G2
5 Second	G3
10 Second	G4
15 Second	G5

7.6 Output String Padding

Off Comma Separated Variable	O1
On Fixed Field	O2

7.7 Baud Rate

2400	B1
4800	B2
9600	B3
19200	B4
38400	B5
1200	B6

7.8 Sample Period

1 Sample Per Second	P1
4 Samples Per Second	P2

7.9 Parity

8 Data, No Parity	F1
8 Data, Even Parity	F2
8 Data, Odd Parity	F3

7.10 Vertical Padding

V1 - Vertical Padding with Zero Disabled
V2 - Vertical Padding with Zero Enabled

The following are only applicable in modes 3&4.

7.11 Unit Identification

Set Identification to ‘x’	Nx

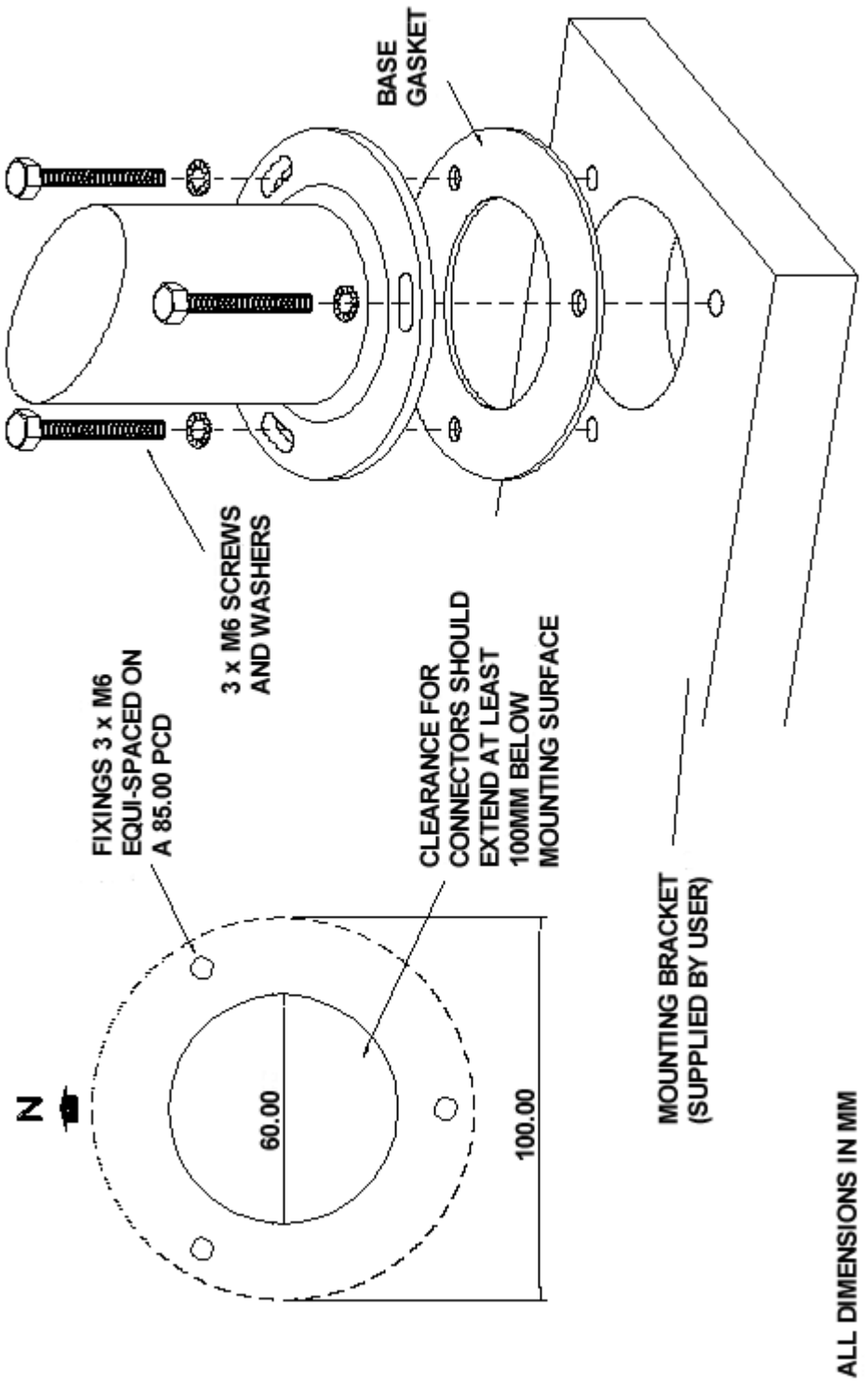
7.12 Diagnostics

Read Serial Number and Type	D1
Read S/W Version	D2
Read System Configuration	D3

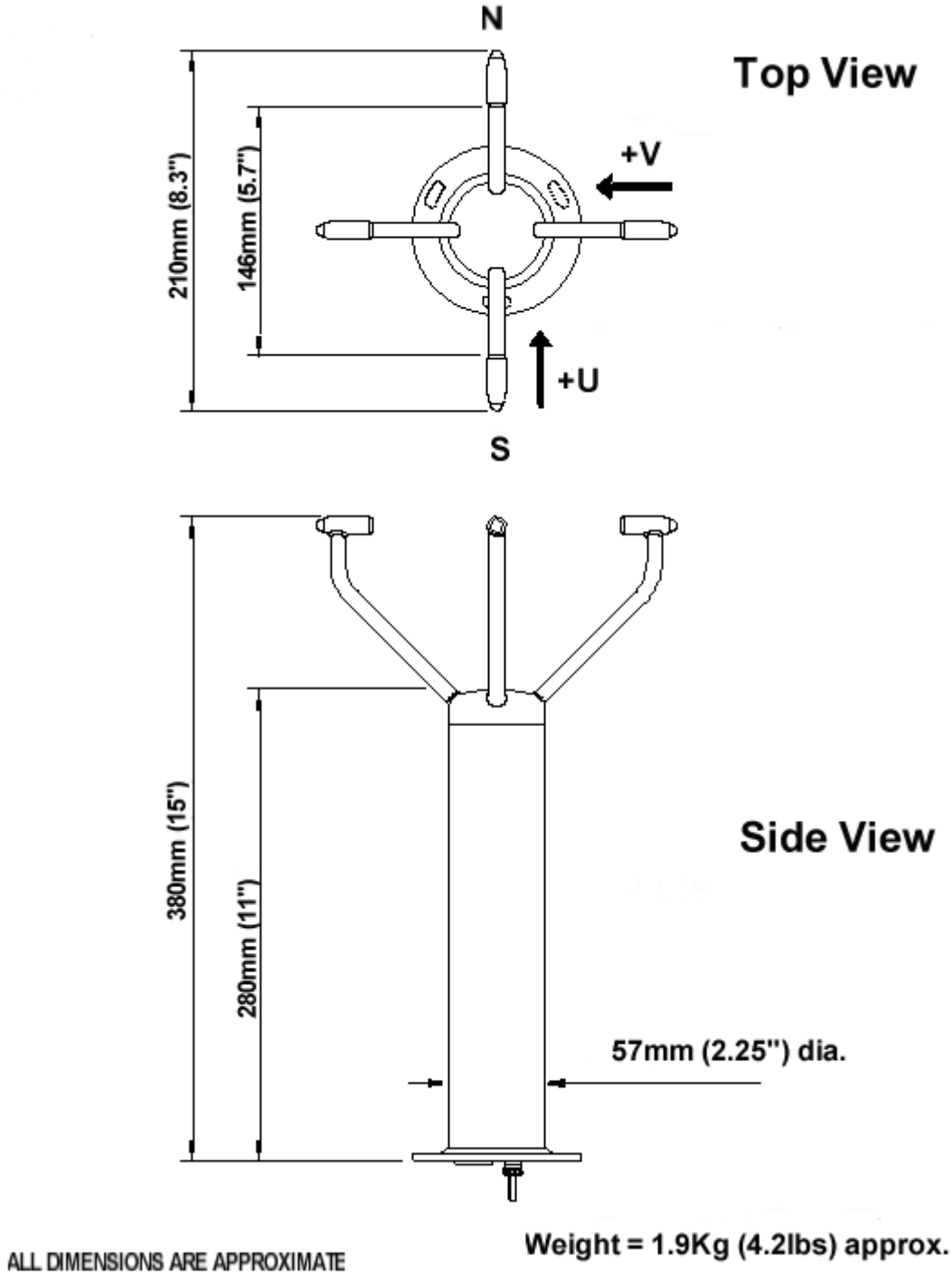
REFER ALSO TO SECTION 6.3

8. DRAWINGS

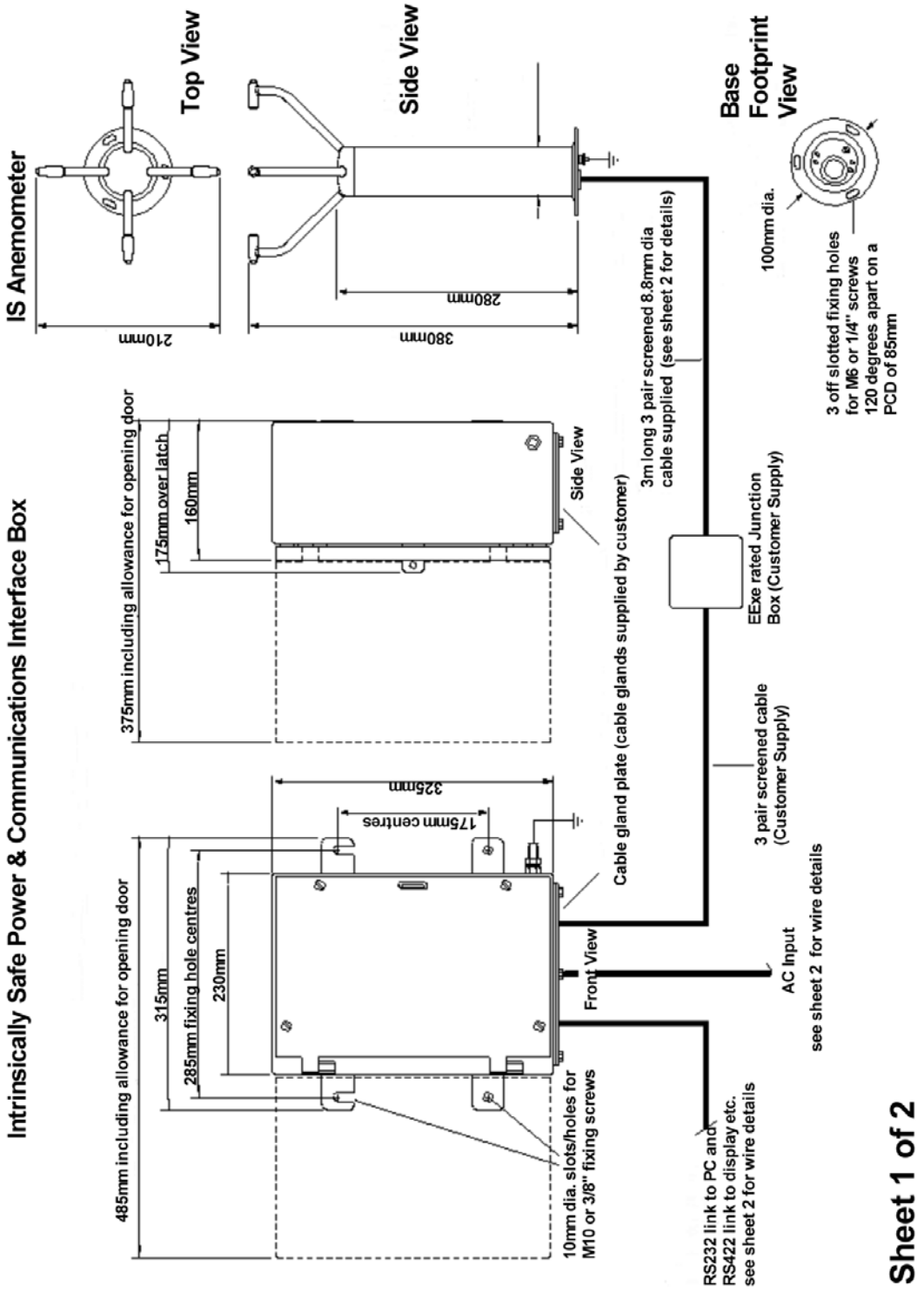
1086-G-045 Anemometer Installation Details


BASE GASKET
3 x M6 SCREWS AND WASHERS
FIXINGS 3 x M6 EQUI-SPACED ON A 85.00 PCD
CLEARANCE FOR CONNECTORS SHOULD EXTEND AT LEAST 100MM BELOW MOUNTING SURFACE
MOUNTING BRACKET (SUPPLIED BY USER)
N
60.00
100.00
ALL DIMENSIONS IN MM

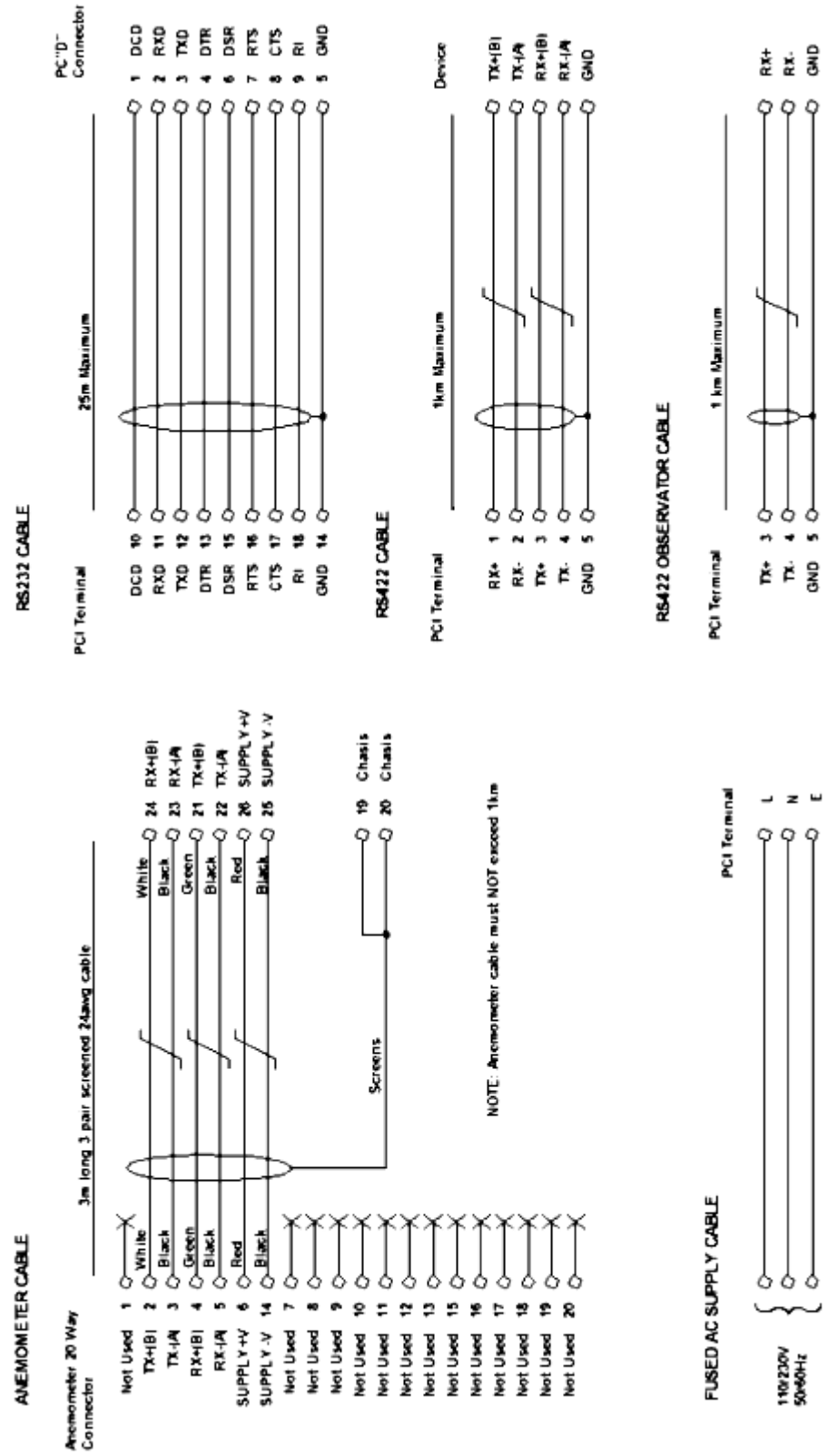
1360-G-026 Type IIc I.S. Anemometer Dimensions



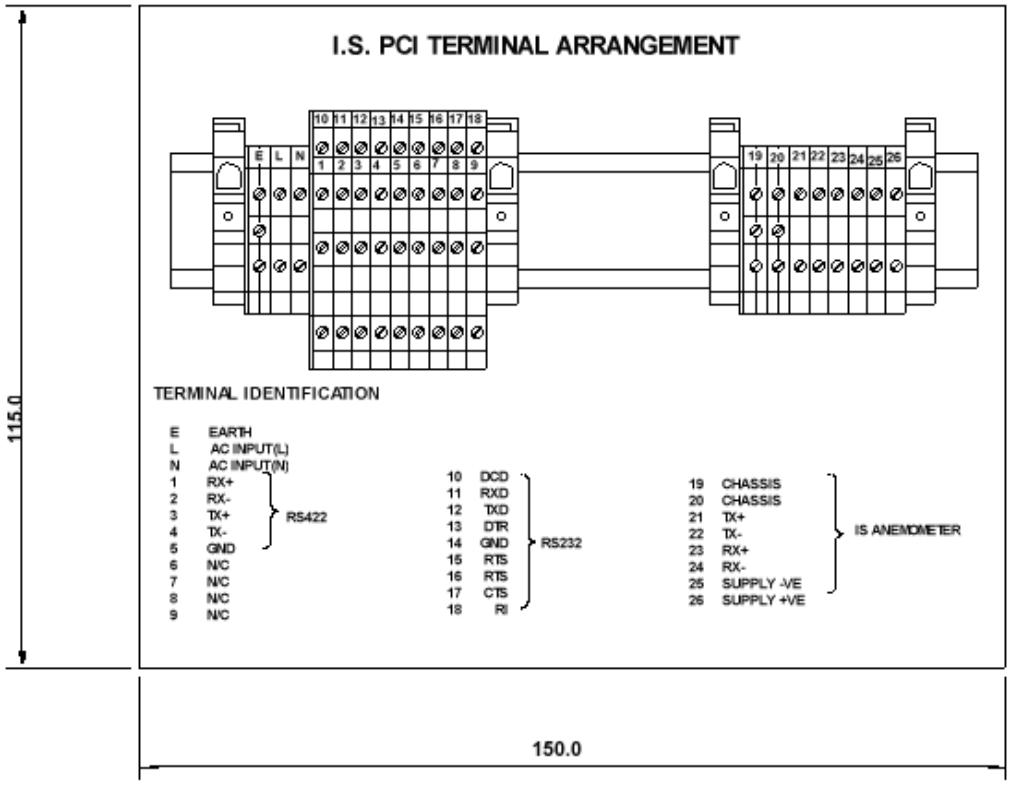
1360-G-028 I.S. WindObserver II System Diagram Sheet 1 of 2


IS Anemometer
Top View
Side View
Base Footprint View
210mm
380mm
280mm
100mm dia.
3 off slotted fixing holes for M6 or 1/4" screws 120 degrees apart on a PCD of 85mm
3m long 3 pair screened 8.8mm dia cable supplied (see sheet 2 for details)
EExe rated Junction Box (Customer Supply)
Intrinsically Safe Power & Communications Interface Box
375mm including allowance for opening door
175mm over latch
160mm
Side View
325mm
175mm centres
Cable gland plate (cable glands supplied by customer)
3 pair screened cable (Customer Supply)
485mm including allowance for opening door
315mm
285mm fixing hole centres
230mm
Front View
AC Input
see sheet 2 for wire details
10mm dia. slots/holes for M10 or 3/8" fixing screws
RS232 link to PC and RS422 link to display etc. see sheet 2 for wire details
Sheet 1 of 2

1360-G-028 I.S. WindObserver II System Diagram Sheet 2 of 2

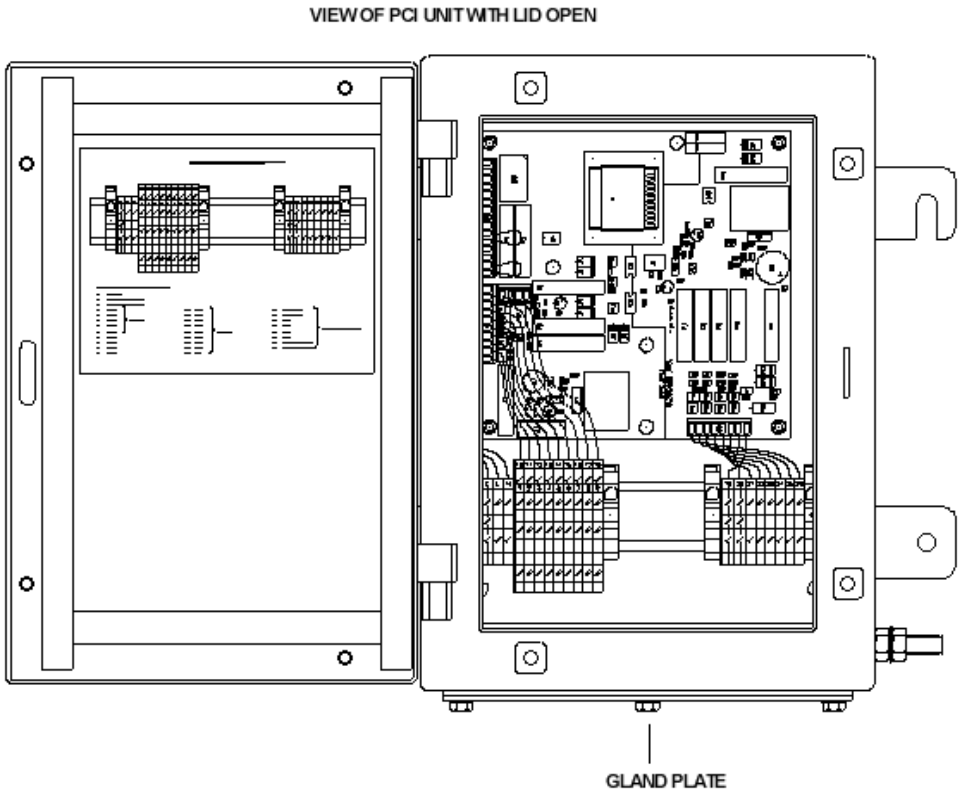


1360-M-039 I.S.Terminal Arrangement



ALL DIMENSIONS ARE IN MM.

1360-G-043 I.S. PCI Unit



9. TECHNICAL SPECIFICATION

9.1 Specification

I.S. Rating - European

For use in Zone 0, 1 and 2 Areas.

Rating	EEx ia (BS EN 50 020)
Gas Group	IIC
Temp Class	T5

Measurement Characteristics

Measurement velocity range	0 to 70m/s
Velocity resolution	0.01m/s
Velocity accuracy	±5% RMS
Direction resolution	1 degree
Direction accuracy	± 4 degrees

Note: Accuracy specification applies from 5°C to 35°C and for wind incidence within ±10° of horizontal.

Temperature Characteristics

Operating	-25°C to +60°C
Storage	-50°C to +75°C

Anem. Electrical

Supply	6 to 12V DC
Current	30mA Peak
	All circuits protected to 0.8 Joule

Environmental

Altitude	0 to 3000m
Humidity	5 to 100% RH
Moisture ingress	IP65

EMC

Emissions	BS EN 50081-1:1992 (class B)
Immunity	BS EN 50082-1:1992

Material

316 Stainless Steel

Serial Interface

One Tx RS422 channel
One Rx RS422 channel
1200, 2400, 4800, 9600, 19200 and 38400 baud
Parity error check available (odd or even)
Serial output rate 1 per second or 4 per second

Physical

Size	380mm x 210mm
Weight	2kg

Connector

Hirose, 20 way socket

Connector pin	**Designation**
1	Not Used
2	RS422_TXB (+)
3	RS422_TXA (-)
4	RS422_RXB (+)
5	RS422_RXA (-)
6	Supply V+
7	Not Used
8	Not Used
9	Not Used
10	Not Used
11	Not Used
12	Not Used
13	Not Used
14	Supply V-
15	Not Use
16	Not Used
17	Not Used
18	Not Used
19	Not Used
20	Not Used

10. POWER AND COMMUNICATIONS INTERFACE

The Intrinsically Safe anemometer must be operated with the intrinsically safe power and communications interface (PCI).

10.1 PCI

For use with single intrinsically safe anemometers.

10.1.1 External Connections

Earth Post
Mains Connector
Anemometer Connector
RS232 Connection
RS422 Connection

10.1.2 Electrical Power Requirements

1) 100Vac - 120Vac, 10VA for the 115V switch position.
2) 200Vac - 250Vac, 10VA for the 230V switch position.

10.1.3 Internal Supply

Supply to the interface circuit	5V, 50mA

10.1.4 External Supply

Supply via the intrinsically safe barrier	10.5V, 50mA
Internal fuse	100mA

10.1.5 RS422 Interface

Standard RS422 interface drivers are connected to the anemometer via zener barriers or galvanic isolation. One is used for the TX pair and the other for the RX pair.

For Connector Pin and Cable Assignments please refer to Section 8, Drawing 1360-G-028.

10.1.6 Cable Requirements

Anemometer

The anemometer is supplied with a 3-Meter long 3 pair 24 AWG screened cable. This should be terminated into an EExe approved junction box. The cable is 9mm in diameter, so a suitable gland should be fitted. The cable between the anemometer and the PCI should be a 3 pair screened and / or armoured, and have a minimum of 0.75mm cross sectional area and a maximum of 2.5mm cross sectional area.

Do not attach the screen of the anemometer to earth at the junction box, it must be attached to terminals 19 and 20 of the PCI via the field cable screen.

If armour cable is used the armour must be connected to earth. **DO NOT** join to the cable screen.

10.1.7 Environmental

Humidity	5 to 90% RH
Moisture Ingress	IP65

10.1.8 Material

316 Stainless Steel

10.1.9 EMC

Emissions	BS EN 50081-1:1992
Immunity	BS EN 50082-1:1992

APPENDIX 1

SUMMARY OF ABBREVIATIONS USED IN THIS MANUAL

AC	Alternating Current
ANEM	Anemometer
ASCII	American Standard Code for Information Interchange
CR	Carriage Return
CSV	Comma Separated Variable
CSA	Cross Sectional Area
CTS	Clear To Send
DC	Direct Current
DCD	Data Carrier Detect
DDD	Direction parameter
DEG	DEGrees
DSR	Data Set Ready
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programmable Read Only Memory
EMC	Electro-Magnetic Compatibility
ETX	End of string character
FPM	Feet Per Minute
GND	GrouND
HEX	Hexadecimal
HZ	Hertz
IP65	Ingress Protection Classification

I.S	Intrinsic Safety
K	Kilometres per hour
Knots	Nautical Measurement of speed
KM	KiloMetre
KPH	KiloMetres Per Hour
LF	Line Feed
M3	Operating Mode 3
M4	Operating Mode 4
mA	MilliAmperes
MPH	Miles Per Hour
mm	MilliMetres
ms	MilliSecond
m/s	Metres per Second
pc	IBM PC or compatible computer
PCI	Power and Communications Interface
POR	Power On Reset
PROCOMM	Terminal emulator software package
RH	Relative Humidity
RMS	Root Mean Squared
RS232	Communications standard
RS422	Communications standard
RTS	Request To Send
RI	Ring Initiate

RX	Receive
SEC	SECond
SRAM	Static Random Access Memory
STX	Start of string character
S/W	SoftWare
TX	Transmit
UV	Cartesian Co-ordinate System
V	Volts
V+	positive Voltage
V-	negative Voltage
VA	VoltAmperes

OPTIONAL EXTRAS

Custom software on application.

APPENDIX 2

PRODUCT APPROVALS

SIRA CERTIFICATION

1. Certificate Number; Sira 00ATEX2217 for the IS WindObserver Power Supply Unit 1360
2. Certificate Number: Sira 00ATEX2218 for the model 1360 IS WindObserver Anemometer

sira
Certification Service

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 00ATEX2217

4 Equipment: I.S. WindObserver Power Supply Unit 1360

5 Applicant: Gill Instruments Ltd.

6 Address: Saltmarsh Park
67 Gosport Street
Lymington
Hampshire
SO41 9EG

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R52A7045A.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 plus Amendments 1 and 2
EN 50020:1994
EN 50284:1999
EN 50281-1-1:1998

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II (1) G
[EEx ia] IIC

Re-issued 8 March 2001
To permit the list of certified drawings to be amended, this is to recognise changes to the revision levels that have occurred as the result of administration.

M D Shearman
Certification Manager

Project Number 52V7590
Date 19 December 2000
Re-issued 8 March 2001
C. Index 12

This certificate and its schedules may only be reproduced in its entirety and without change

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd

ST&C(Chester) Form 9176 Issue 4

sira
Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 00ATEX2217

13 **DESCRIPTION OF EQUIPMENT**

The I.S. WindObserver Power Supply Unit 1360 is designed to provide an intrinsically safe supply and signal connections to a model 1360 I.S. Anemometer certified as Sira 00ATEX2218. The equipment comprises a printed circuit board that accommodates; an intrinsically safe transformer, opto isolators and voltage clamping, current and power limiting circuitry. A DIN rail accommodates the terminals. The PCB and terminals are housed inside a metal enclosure that affords a degree of ingress protection of at least IP20. The connections to the certified Anemometer are made via connector J2 to DIN rail mounted terminals 19 to 26.

Non-Hazardous are connections

Terminals marked E, L and N and Terminals 1 to 18:

Um = 250 Vrms.

Terminals 1 to 18 enable the equipment signal circuits to connect to low power RS422 and RS232 non-hazardous area circuits respectively.

Hazardous area connections

Terminals 19 to 26

Uo = 11.55 V
Io = 162 mA
Po = 0.417 W
Ci = 0
Li = 0

Cable parameters

The capacitance and either the inductance or the inductance to resistance (L/R) ratio of the load connected to each separate circuit listed above must not exceed the following values.

Group	Capacitance (μF)	Inductance (μH)	L/R Ratio (μH/Ω)
IIC	1.59	800	90
IIB	10.8	3200	360
IIA	43	6400	720

Date 19 December 2000
Re-issued 8 March 2001

This certificate and its schedules may only be reproduced in its entirety and without change

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd

ST&C(Chester) Form 9176 Issue 4

sira
Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 00ATEX2217

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing	Sheet	Rev	Date	Title
1360-G-027	1 of 1	1	08 Dec 00	I.S. PCI Enclosure Assembly
1360-G-041	1 of 1	1	08 Dec 00	I.S. PCI Box Lid Assembly
1360-M-036	1 of 1	1	08 Dec 00	I.S. PCI Box Nameplate
1360-M-037	1 of 1	1	08 Dec 00	Cover Plate
1360-M-038	1 of 1	1	08 Dec 00	DIN Rail Machined
1360-M-039	1 of 1	1	08 Dec 00	Wiring Label
1360-C-009	1 of 1	1	04 Dec 00	Intrinsically Safe Power & Communications Interface
1360-T-009	1 of 1	1	06 Dec 00	IS Anem PSU PCB Tracking Details
1360-M-009	1 of 1	1	05 Dec 00	I.S. PCI PCB Manufacturing Details
1360-M-001	1 of 1	1	08 Dec 00	I.S. Transformer Assembly
1360-10-003	1 to 3	01B	17 Jan 01	I.S. PCI PCB Assembly (Galvanic Isolation)
1360-10-011	1 of 1	01	08 Dec 00	DIN Rail Sub Assembly
1360-10-012	1 of 1	01	08 Dec 00	IIC I.S. Electronics PCB Assembly
1360-00-013	1 of 1	01	08 Dec 00	Outdoor Galvanic Isolated PCI Final Assembly
1360-G-028	1 to 2	1	08 Dec 00	I.S. wind Observer II System Diagram

14.2 Report No. R52A7045A

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52A7045A.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of SCS Certificates.

17.2 The power supply unit transformer, T1, is subject to routine tests at voltages of 2500 Vrms between input and output windings, 1000 Vrms between windings and core, and 1500 Vrms between the winding supplying I.S. circuit and the other output winding, in accordance with clause 11.2 of EN 50020:1994.

Date 19 December 2000
Re-issued 8 March 2001

This certificate and its schedules may only be reproduced in its entirety and without change

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd

ST&C(Chester) Form 9176 Issue 4

sira
Certification Service

1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 00ATEX2218

4 Equipment: Model 1360 I.S. Anemometer

5 Applicant: Gill Instruments Ltd.

6 Address: Saltmarsh Park
67 Gosport Street
Lymington
Hampshire
SO41 9EG

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R52A7045A.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 plus Amendments 1 and 2
EN 50020:1994
EN 50284:1999
EN 50281-1-1:1998

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

Ex II 1 GD
EEx ia IIC T5

Re-issued 8 March 2001
To permit the list of certified drawings to be amended, this is to recognise changes to the revision levels that have occurred as the result of administration, and to delete drawing number 1360-032 that is superfluous.

Project Number 52V7590
Date 19 December 2000
Re-issued 8 March 2001
C. Index 13

M D Shearman
Certification Manager

This certificate and its schedules may only be reproduced in its entirety and without change

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd

ST&C(Chester) Form 9176 Issue 4

sira
Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 00ATEX2218

13 **DESCRIPTION OF EQUIPMENT**

The Model 1360 I.S. Anemometer is designed to measure the speed of movement of the air (or other atmosphere) that passes between its ultrasonic transmitter receiver heads.

The apparatus comprises; four transducer arms attached to a stainless steel enclosure that houses two printed circuit boards, piezo electric transducers, and connectors all of which are completely encapsulated within the enclosure.

External electrical connections are made to a 20-way connector located in the base of the apparatus.

The apparatus is designed to connect to the intrinsically safe outputs of the I.S. WindObserver Power Supply Unit 1360, EC Type-Examination Certificate No. Sira 00ATEX2217.

20-Way Connector:

Ui = 11.55V
Ii = 162mA
Pi = 0.417W
Ci = 0
Li = 0

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing	Sheet	Rev	Date	Title
1360-G-025	1 of 1	1	08 Dec 00	Type IIC IS Anemometer
1360-G-026	1 of 1	1	08 Dec 00	Type IIC IS Anemometer Dimensions
1360-G-019	1 of 1	1	08 Dec 00	IS 2 Axis Transducer Arm Assembly
1360-00-021	1 of 1	01	08 Dec 00	IIC Intrinsically Safe Anemometer Final Assembly
1360-10-020	1 of 1	01	08 Dec 00	IS 2 Axis Head Assembly
1360-10-034	1 of 1	01	08 Dec 00	IS Transducer Assembly
1360-M-040	1 of 1	1	08 Dec 00	Housing Tube Printed
1360-C-032	1 of 1	1	26 Jun 00	IS Anemometer SM Base Interface Board
1360-10-032	1 of 1	01	08 Dec 00	IIC IS Anemometer Base Interface Board Assembly
1360-T-032	1 of 1	1	06 Dec 00	IS Anemometer Base PCB Tracking Details
1360-C-010	1 of 1	1	09 Jan 99	Intrinsically Safe Anemometer Single Board
1360-10-010	1 to 3	01	08 Dec 00	IIC IS PCB Assembly

14.2 Report No. R52A7045A

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

Date 19 December 2000
Re-issued 8 March 2001

This certificate and its schedules may only be reproduced in its entirety and without change

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd

ST&C(Chester) Form 9176 Issue 4

sira
Certification Service

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE Sira 00ATEX2218

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in Report No. R52A7045A.

17 **CONDITIONS OF CERTIFICATION**

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of SCS Certificates.

Date 19 December 2000
Re-issued 8 March 2001

This certificate and its schedules may only be reproduced in its entirety and without change

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England
Tel: +44 (0) 1244 670900 Fax: +44 (0) 1244 681330
Email: exhazard@siratc.co.uk
Sira Certification Service is a service of Sira Test & Certification Ltd

ST&C(Chester) Form 9176 Issue 4